July 23, 2021
(revised July 26 to add additional images of approved plans; and July 28 to address Pond 5 inspection)

TO: FILE

FROM: Chief Engineer, Guam Environmental Protection Agency

SUBJECT: Site Inspections at Samsung Mangilao Solar Project Site, July 23 and 18, 2021

I inspected to subject site on Friday, July 23, 2021 between about 11:30 a.m. and 12:30 a.m. with Water Pollution Control Manager Johnny Abedania, in response to complaints that had been forwarded by email earlier that same morning, and by social media earlier in the week. Upon arrival at the site we were met by the site safety officer and brought to the front entrance to meet the Samsung project management team. Mr. ByungHyup Kim was introduced as the project manager for Samsun E&C America, Inc. Once they greeted us, I explained that we were there in response to a complaint and that we wanted to start at their field office with a review of the site plans, and then proceed from there to verify whether the approved erosion and sediment control (E&SC) measures had been installed as per the approved plans.

We followed them to the site office and the site plans were brought to us, in addition to a series of aerial photos of the project site taken by drone. The most recent aerials were labeled July 22, 2021, and we confirmed with the project manager and support staff that the photos were taken on that day. See following pages for photos of site plans and drone aerial images, with notes.

From the aerial images I noted that the location of Pond 4 appeared to coincide with the location of the project offices. Mr. Kim and staff confirmed that Pond 4 had not been constructed yet, and that the project offices were indeed located in the same spot. I also noted that construction of Ponds 1 and 3 appeared to still be underway. This was also confirmed by Mr. Kim and others that were present.

We then set out to inspect the area of Ponds 4 and 2 by foot. Pond 4 had not been constructed, but the beginnings of the earthworks berm that would form the lower portions of the ponds were present, but not complete. I observed evidence of a large discharge of runoff from the area toward the fence, and a single line of silt fence that had been buried by accumulated sediment. The Samsung staff present confirmed that this was the location of the complaint from the neighbors. This discharge was located in the area where Pond 4 was supposed to have been built, and I pointed out that if it had been built as per the plan, the discharge to the neighbor's property would likely not have happened. We then walked further down slope to Pond 2, which had been built and was full of water and sediment, although the surrounding berm did not look finished and I did not get an affirmative answer if the pond was final or still in progress.

We then drove through the project site to visit Ponds 1 and 3. On the way I stopped and took pictures of an area where evidence of a large discharge of runoff was present. This area does not appear to be served by a sedimentation basin (pond) in the approved E&SC plans, and is directly upstream of Marbo Cave according to the site plans. On the way between Ponds 3 and 1, I observed that the perimeter swale had a large number of ironwood saplings growing in it, as well as a lot of sediment that was obstructing the cross section of the swale. (See addendum below – Pond 5 was added to the site E&SC plans and approved by GEPA on January 4, 2021. I inspected with Johnny Abedania on July 28, 2021 to further investigate).

Pond 3 was mostly in place but according to Mr. Kim it was not yet finished; the stone overflow structure still needed to be built. We observed that runoff had only filled Pond 3 about a foot or two. Pond 1 was complete, according to Mr. Kim. We observed that runoff had filled Pond 3 almost to the point of overflowing, by evidence of a clearly visible high water mark. However Mr. Kim stated that it had not overflowed. We observed that there were several stockpiles of material in Pond 1 that served to reduce its capacity to hold runoff. We also observed that a large amount of sediment had accumulated in Pond 3, and discussed the need for maintenance to remove it periodically, and completely once the site was stabilized with vegetation, to ensure that the pond worked as an infiltration basin post-construction.

I held a brief discussion at this point to summarize our findings. The summary consisted of the following:

- Sedimentation basins (ponds) had not been constructed prior to the start of clearing and construction operations, and that this sequence of operations was required by Guam's regulations and was also spelled out in the approved plans that we reviewed at the office. I noted that Samsung is a very large company and should have known the proper sequence of installing E&SC measures.
- There was evidence of discharge of runoff off-site, and also evidence submitted to us electronically that sediment-laden runoff had discharged to the ocean.
- I strongly recommended that Samsung begin construction of Pond 4, at the very least the lower sections of the pond where the office is not located, to prevent further discharge.
- I recommended that Samsung take active steps to begin re-vegetating the site to stabilize the soils, which will reduce both runoff volume and the quantity of sediment that accumulates in the ponds.
- I recommended that the ironwood saplings seen growing in the perimeter swales be removed as soon as possible, otherwise they would block the flow of water and potentially cause discharge of runoff off-site, instead of to the approved ponds.

I concluded by informing Mr. Kim that I would provide my findings to the GEPA Administrator and USEPA NPDES Construction General Permits program, and that a determination of whether to pursue enforcement action would be made by them.

ADDENDUM (July 28, 2021)

Upon review of revisions to the E&SC plan approved by GEPA on January 4, 2021, which added Pond 5, I conducted a second inspection at the site to further investigate the area that we had observed which appeared to have discharged off-site toward Marbo Cave.

In addition, on the morning of July 28, 2021, Samsung (via Mr. Kim) submitted an update email describing work to maintain Pond 5, which stated "Pond 5 Cleaning: Cleaning continues while simultaneously trimming the rough edges to create a smooth slope to tiered bench levels. "

I conducted the inspection with Helen Gumataotao, Environmental Inspector I, between approximately 11:00 a.m. and 11:30 a.m. on July 28, 2021. We were met at the front gate by Mr. Kim and other representatives of Samsung. I explained that we were there to inspect the location of Pond 5, which we had missed during the previous inspection on July 23. We were led into the site and to the location of Pond 5. We saw that active construction was underway, and Mr. Kim confirmed that Pond 5 had not been fully installed yet. We saw that the excavation for Pond 5A had been partially completed, which we were told happened in June, but we also observed and confirmed that the perimeter swale was not connected to the Pond 5A excavation.

We observed that the perimeter swale had discharged to the open ground near the fence, and along with the surface runoff from the surround project area, had left a very large alluvial/delta formation of sediments, up to and including rocks around 1 to 2 feet in diameter. The deposited sediments could be seen extending into the forest far past the site boundaries, toward the Marbo Cave area.

Pond 5B installation had only just begun, following our July 23 inspection. Mr. Kim explained that a temporary pond had been created using the available earth fill material, as shown in the photos. The permanent pond will be formed by the embankment downhill from the temporary embankment, but placement and compaction of fill for the permanent embankment had not yet begun. I expressed my concern to Mr. Kim that the temporary pond berm might be easily washed out by another large storm event because it appeared to have not been compacted in lifts, and was constructed of a topsoil-like material that did not appear to meet the typical requirements for embankment fill.

Other contractors (Ian Corporation) were seen on site installing a new line of silt fence along the property boundary, downslope of the Pond 5 area.

We observed extensive scouring and erosion of almost the entire upland project area above the Pond 5 area, with the ground surface beneath the solar panels visibly scoured down to bare limestone, with only thin deposits of sand and other sediments showing the direction that runoff had taken during the heavy rains the week before.

Upon return to the office I informed Jesse Cruz of the Environmental Monitoring and Surveillance Division of the possibility that sediment and runoff had reached Marbo Cave, and suggested that he inspect. He conducted an inspection the same afternoon and found evidence of significant

damage from runoff and sedimentation inside and around Marbo Cave. His findings will be detailed in a separate report.

See attached photos.

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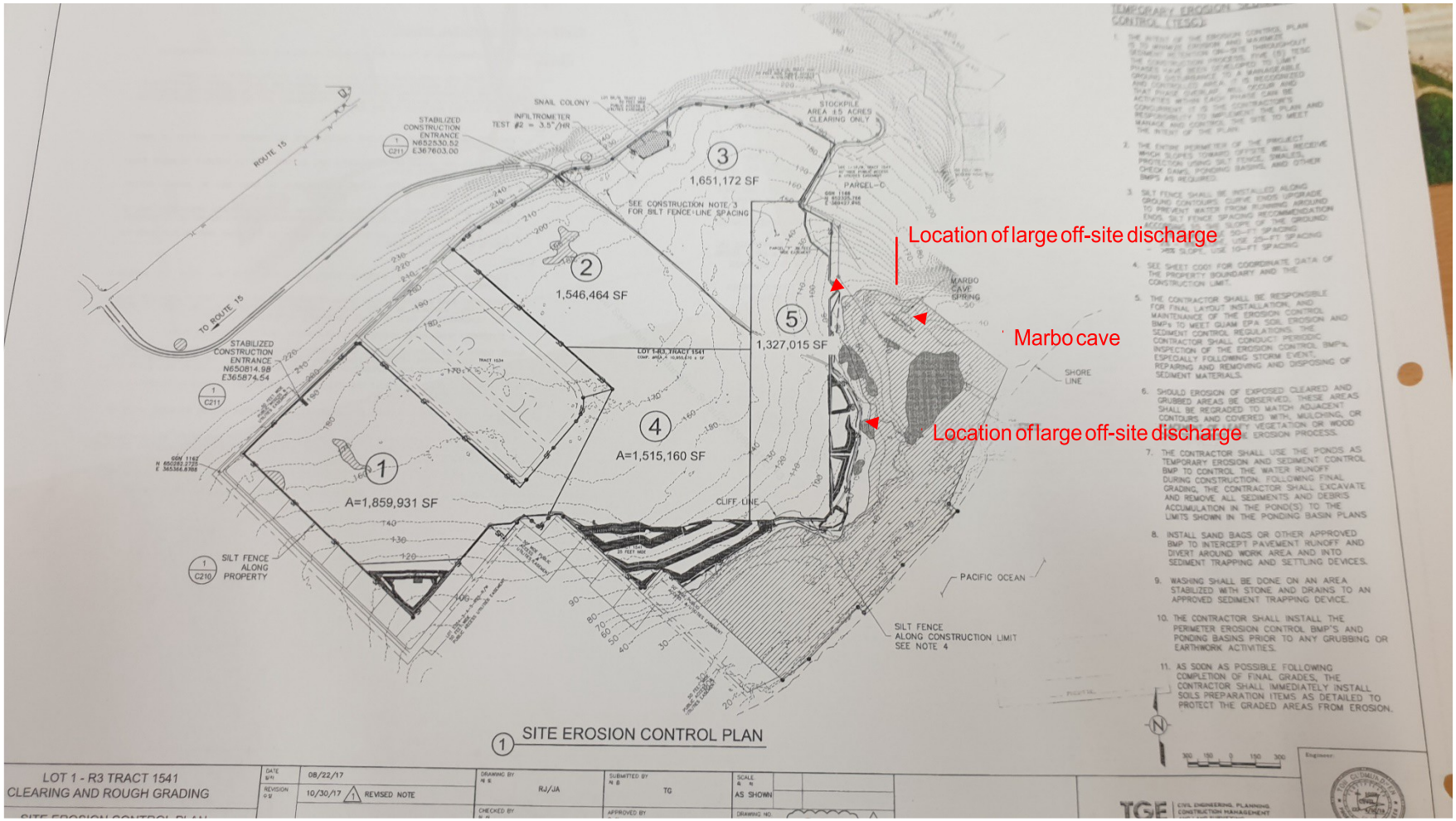
Date: 2021.07.29 14:19:22 +10'00'

BRIAN G BEARDEN
CAPT, U.S. Public Health Service
Chief Engineer, Guam EPA

(re-signed on July 29, 2021 in order to correct obstructed captions on pages 5, 7, and 8)

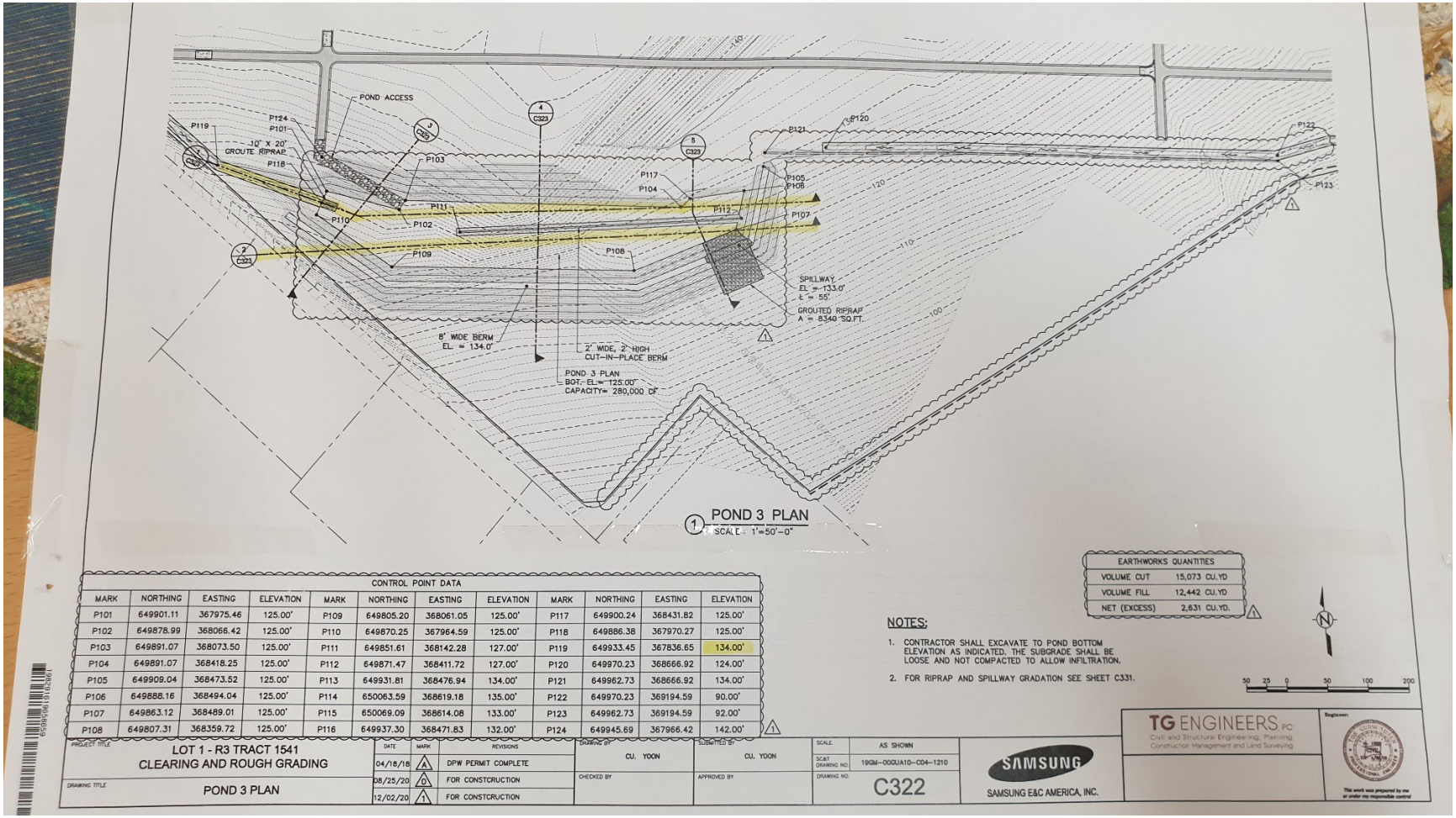
Overall site plan, but note that the designs of Pond 3 (center bottom) and Pond 4 (right bottom) were changed, and a Pond 5 was added (upper annotated discharge location) w/ GEPA approval (see additional photos)



(July 23, 2021)

Annotations in red added to highlight location of discharges toward Marbo Cave (upper) and from Pond 4 area (lower), which was the subject of the complaint.

Revised Pond 3 plan, as approved by GEPA July 2020. Note stone riprap at overflow. Per Samsung, this had not yet been installed. (July 23, 2021)



CONTROL POINT DATA

MARK	NORTHING	EASTING	ELEVATION	MARK	NORTHING	EASTING	ELEVATION	MARK	NORTHING	EASTING	ELEVATION
P101	649901.11	367975.46	125.00'	P109	649805.20	368061.05	125.00'	P117	649900.24	368431.82	125.00'
P102	649878.99	368066.42	125.00'	P110	649870.25	367964.59	125.00'	P118	649886.38	367970.27	125.00'
P103	649891.07	368073.50	125.00'	P111	649851.61	368142.28	127.00'	P119	649933.45	367836.65	134.00'
P104	649891.07	368418.25	125.00'	P112	649871.47	368411.72	127.00'	P120	649970.23	368666.92	124.00'
P105	649909.04	368473.52	125.00'	P113	649931.81	368476.94	134.00'	P121	649962.73	368666.92	134.00'
P106	649888.16	368494.04	125.00'	P114	650063.59	368619.18	135.00'	P122	649970.23	369194.59	90.00'
P107	649863.12	368489.01	125.00'	P115	650069.09	368614.08	133.00'	P123	649962.73	369194.59	92.00'
P108	649807.31	368359.72	125.00'	P116	649937.30	368471.83	132.00'	P124	649945.69	367966.42	142.00'

EARTHWORKS QUANTITIES

VOLUME CUT	15,073 CU.YD
VOLUME FILL	12,442 CU.YD
NET (EXCESS)	2,631 CU.YD.

NOTES:

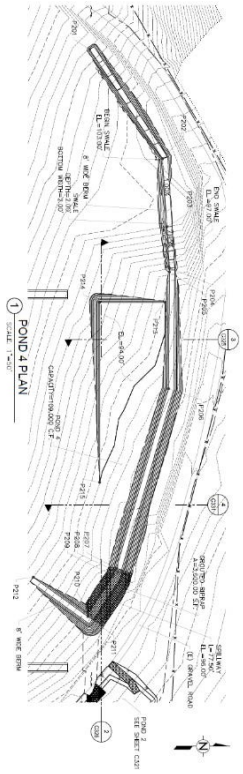
1. CONTRACTOR SHALL EXCAVATE TO POND BOTTOM ELEVATION AS INDICATED. THE SUBGRADE SHALL BE LOOSE AND NOT COMPACTED TO ALLOW INFILTRATION.
2. FOR RIPRAP AND SPILLWAY GRADATION SEE SHEET C331.

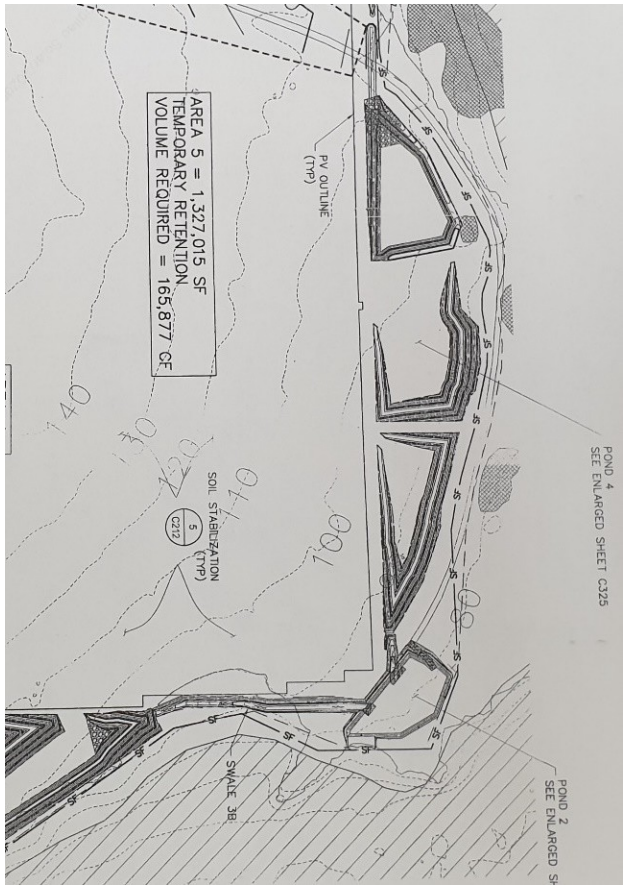
PROJECT TITLE: LOT 1 - R3 TRACT 1541 CLEARING AND ROUGH GRADING	DATE / MARK / REVISIONS: 04/18/18 A DPW PERMIT COMPLETE; 08/25/20 0 FOR CONSTCRUCTION; 12/02/20 1 FOR CONSTCRUCTION	DRAWING BY: CU. YOON	SUBMITTED BY: CU. YOON
DRAWING TITLE: POND 3 PLAN		CHECKED BY	APPROVED BY
SCALE: AS SHOWN; SCAT DRAWING NO.: 19GM-00GUA10-CD4-1210; DRAWING NO.: C322			

TG ENGINEERS PC
Civil and Structural Engineering, Planning, Construction Management and Land Surveying

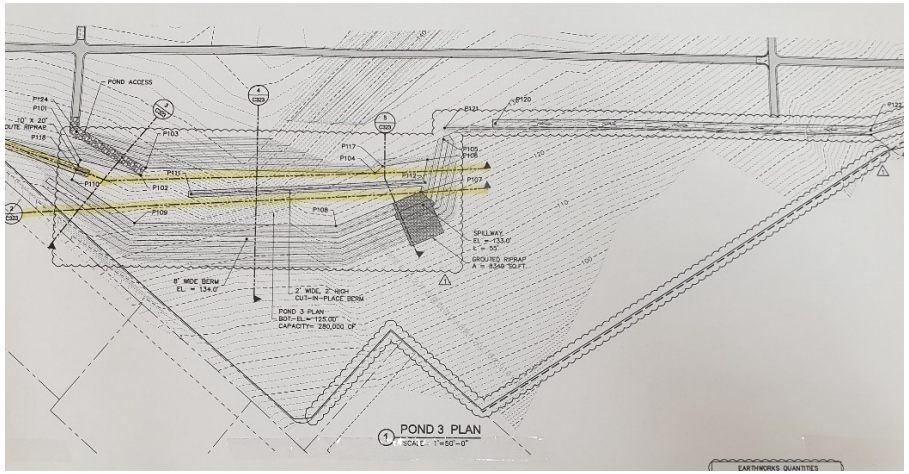
SAMSUNG
SAMSUNG E&C AMERICA, INC.

Site aerial image taken July 22, compared to approved E&SC plans (revised plan approved July 2020 in center), showing location of office at Pond 4 site (July 23, 2021)

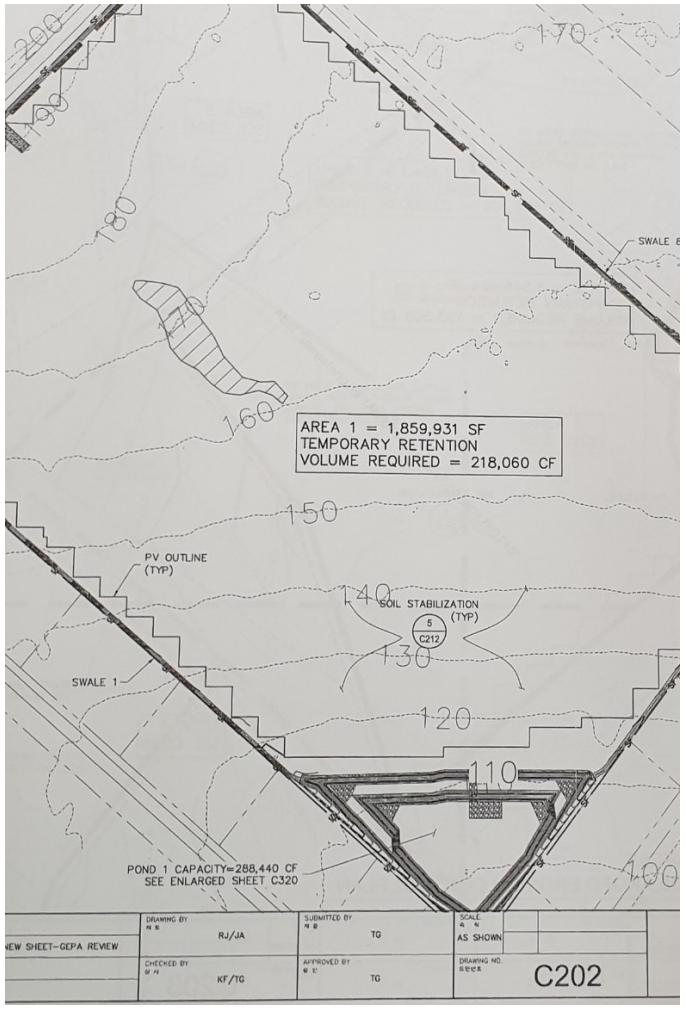




Aerial photo dated July 22, 2021 at location of Pond compared to approved E&SC plan (July 23, 2021)



Site aerial image of Pond 1 area, taken July 22, 2021, compared to approved E&SC plan: (July 23, 2021)



View looking from site office to area where start of Pond 4 berm and swale should be located. (July 23, 2021)

View looking downslope where Pond 4 berm construction has begun, and toward Pond 2 in distance. (July 23, 2021)

Looking back upslope toward Project Site Office, showing start of (revised) Pond 4 excavation (July 23, 2021)

Location of discharge from Pond 4 area to off-site. This is reportedly the location of the complaint. See next page for close up. (July 23, 2021)

Close up of Pond 4 discharge location. Note accumulated sediment in delta-pattern, and overwhelmed silt fence. (July 23, 2021)

Pond 2, with accumulated runoff and sediment from storm. This pond does not appear to be finished. (July 23, 2021)

Location of apparent discharge toward Marbo Cave. See next photo for close-up. (July 23, 2021)

Close-up of area that appears to be a large, unprotected off-site discharge toward Marbo Cave area. Note large delta-type formation of sediments, indicating long-term history of discharge. (July 23, 2021)

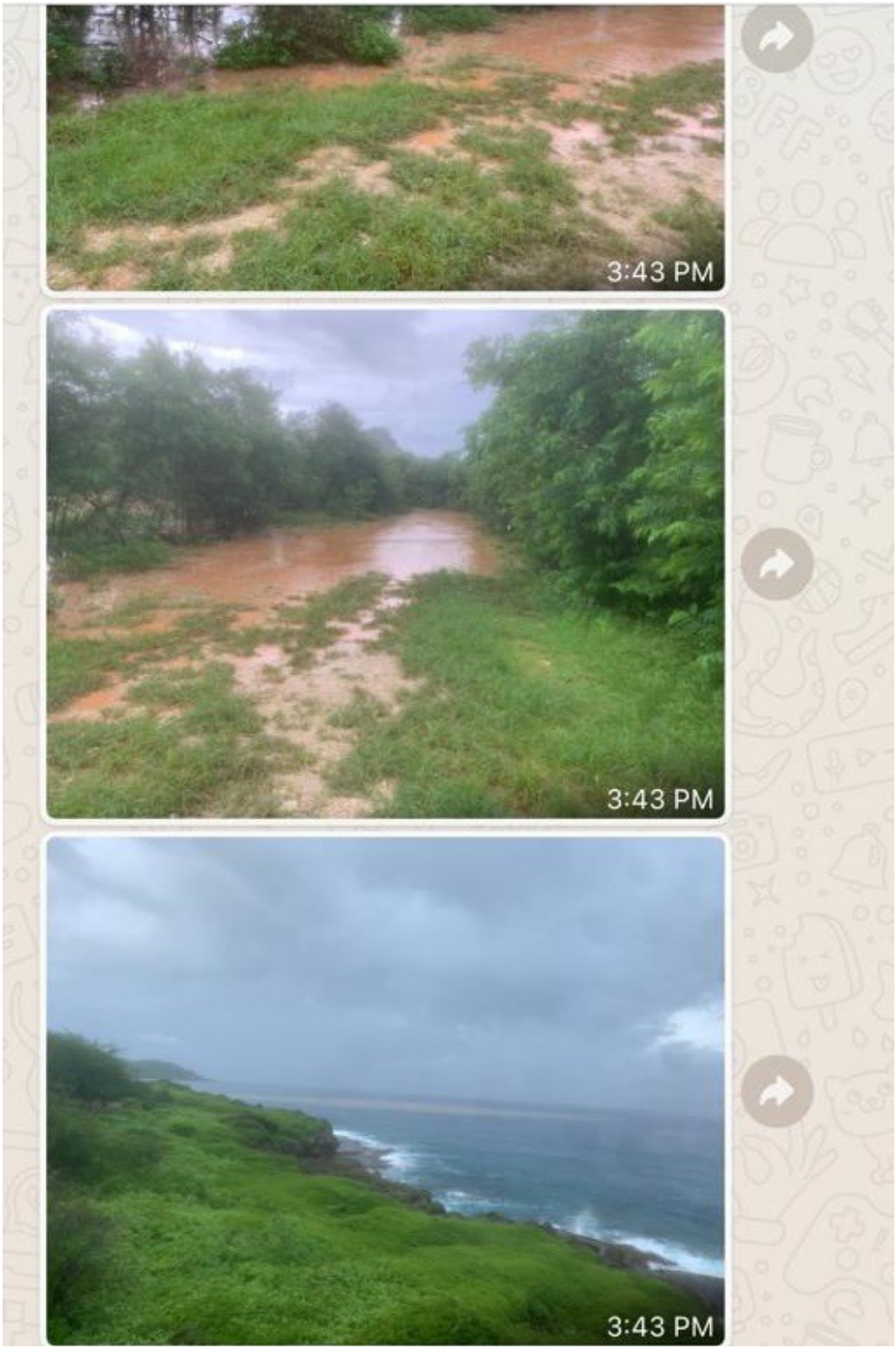
Pond 3. Overflow weir in distance is not yet finished – still requires stone riprap. (July 23, 2021)

Perimeter berm which conveys runoff to Pond 3. Ironwood saplings and a large amount of accumulated sediment obstruct the flow. (July 23, 2021)

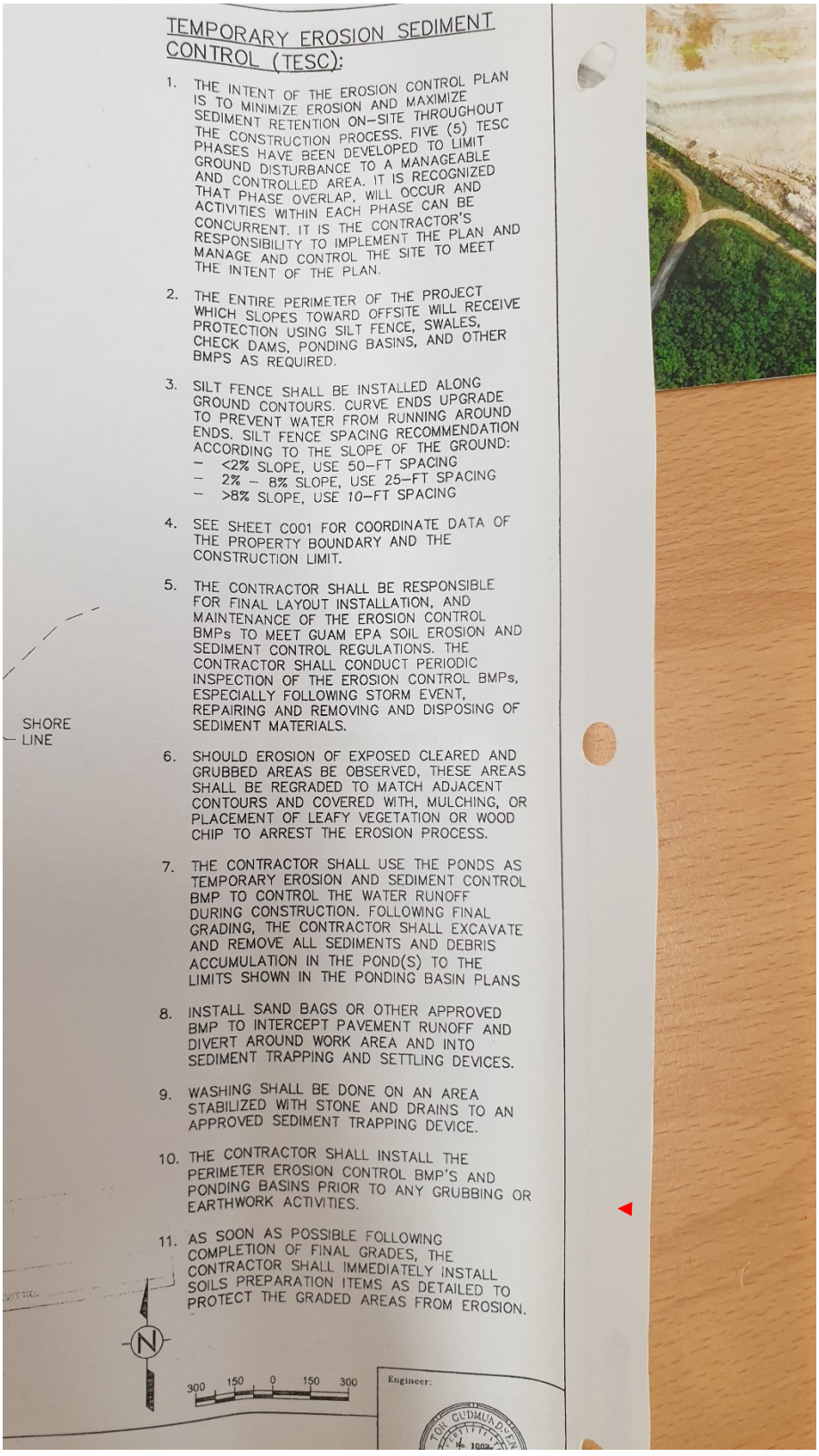
Pond 1. Note stockpiles of earth material, which reduce pond capacity. Also note high water mark from the previous storms. (July 23, 2021)

Close up of Pond 1 rim, showing high water mark indicating near-overtopping from prior storm. (July 23, 2021)

Images received over social media with original complaint. Bottom image purports to show sediment plume in ocean, originating from Samsung Mangilao Solar Project. (July 23, 2021)



Notes section from approved E&SC plan as obtained from Samsung during inspection. (July 23, 2021)



TEMPORARY EROSION SEDIMENT CONTROL (TESC):

1. THE INTENT OF THE EROSION CONTROL PLAN IS TO MINIMIZE EROSION AND MAXIMIZE SEDIMENT RETENTION ON-SITE THROUGHOUT THE CONSTRUCTION PROCESS. FIVE (5) TESC PHASES HAVE BEEN DEVELOPED TO LIMIT GROUND DISTURBANCE TO A MANAGEABLE AND CONTROLLED AREA. IT IS RECOGNIZED THAT PHASE OVERLAP, WILL OCCUR AND ACTIVITIES WITHIN EACH PHASE CAN BE CONCURRENT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMPLEMENT THE PLAN AND MANAGE AND CONTROL THE SITE TO MEET THE INTENT OF THE PLAN.
2. THE ENTIRE PERIMETER OF THE PROJECT WHICH SLOPES TOWARD OFFSITE WILL RECEIVE PROTECTION USING SILT FENCE, SWALES, CHECK DAMS, PONDING BASINS, AND OTHER BMPS AS REQUIRED.
3. SILT FENCE SHALL BE INSTALLED ALONG GROUND CONTOURS. CURVE ENDS UPGRADE TO PREVENT WATER FROM RUNNING AROUND ENDS. SILT FENCE SPACING RECOMMENDATION ACCORDING TO THE SLOPE OF THE GROUND:
   - <2% SLOPE, USE 50-FT SPACING
   - 2% - 8% SLOPE, USE 25-FT SPACING
   - >8% SLOPE, USE 10-FT SPACING
4. SEE SHEET C001 FOR COORDINATE DATA OF THE PROPERTY BOUNDARY AND THE CONSTRUCTION LIMIT.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL LAYOUT INSTALLATION, AND MAINTENANCE OF THE EROSION CONTROL BMPs TO MEET GUAM EPA SOIL EROSION AND SEDIMENT CONTROL REGULATIONS. THE CONTRACTOR SHALL CONDUCT PERIODIC INSPECTION OF THE EROSION CONTROL BMPs, ESPECIALLY FOLLOWING STORM EVENT, REPAIRING AND REMOVING AND DISPOSING OF SEDIMENT MATERIALS.
6. SHOULD EROSION OF EXPOSED CLEARED AND GRUBBED AREAS BE OBSERVED, THESE AREAS SHALL BE REGRADED TO MATCH ADJACENT CONTOURS AND COVERED WITH, MULCHING, OR PLACEMENT OF LEAFY VEGETATION OR WOOD CHIP TO ARREST THE EROSION PROCESS.
7. THE CONTRACTOR SHALL USE THE PONDS AS TEMPORARY EROSION AND SEDIMENT CONTROL BMP TO CONTROL THE WATER RUNOFF DURING CONSTRUCTION. FOLLOWING FINAL GRADING, THE CONTRACTOR SHALL EXCAVATE AND REMOVE ALL SEDIMENTS AND DEBRIS ACCUMULATION IN THE POND(S) TO THE LIMITS SHOWN IN THE PONDING BASIN PLANS
8. INSTALL SAND BAGS OR OTHER APPROVED BMP TO INTERCEPT PAVEMENT RUNOFF AND DIVERT AROUND WORK AREA AND INTO SEDIMENT TRAPPING AND SETTLING DEVICES.
9. WASHING SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND DRAINS TO AN APPROVED SEDIMENT TRAPPING DEVICE.
10. THE CONTRACTOR SHALL INSTALL THE PERIMETER EROSION CONTROL BMP'S AND PONDING BASINS PRIOR TO ANY GRUBBING OR EARTHWORK ACTIVITIES.
11. AS SOON AS POSSIBLE FOLLOWING COMPLETION OF FINAL GRADES, THE CONTRACTOR SHALL IMMEDIATELY INSTALL SOILS PREPARATION ITEMS AS DETAILED TO PROTECT THE GRADED AREAS FROM EROSION.

SHORE LINE

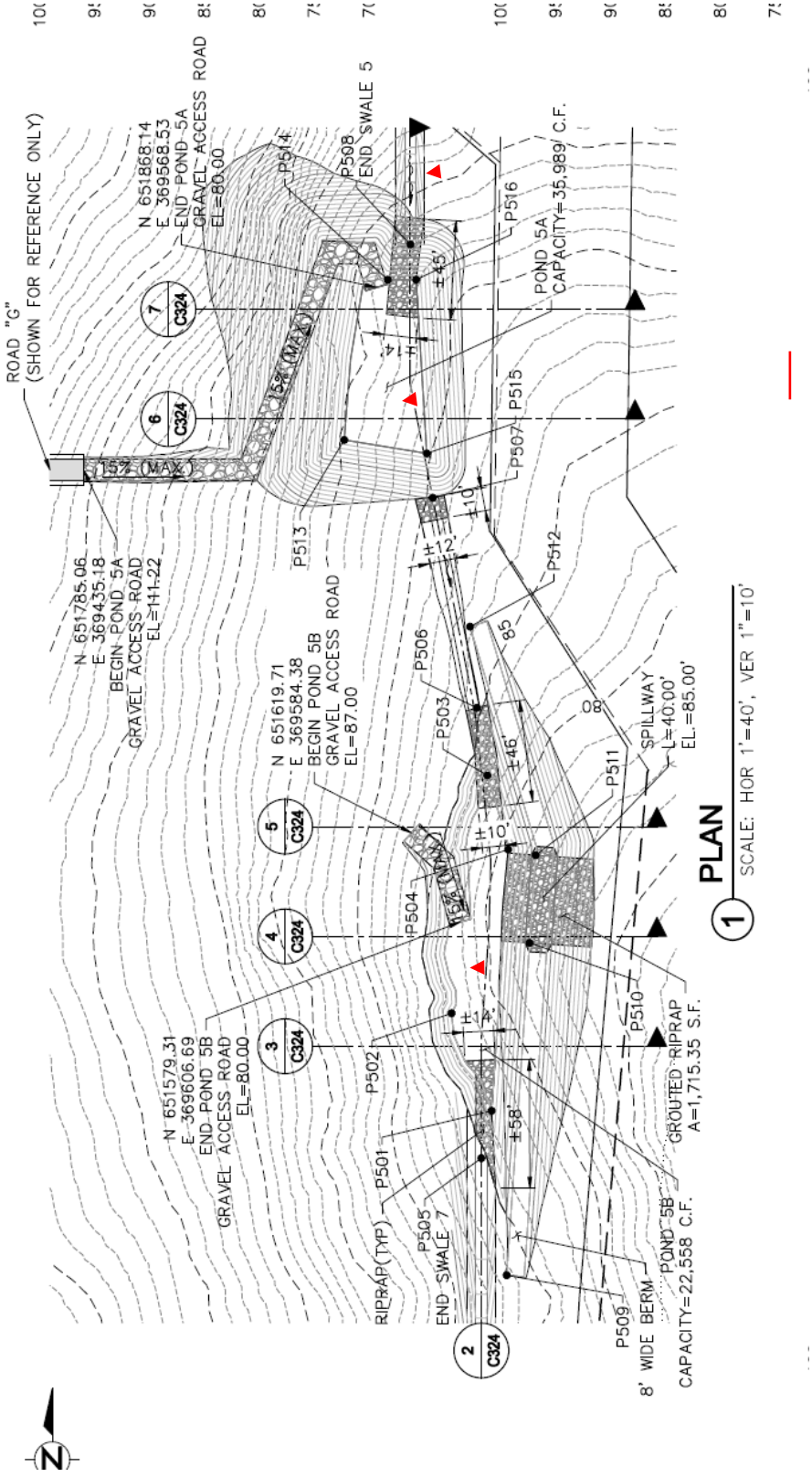
N

300 150 0 150 300

Engineer:

Note concerning required sequence of construction

ADDENDUM: Inspection of Pond 5, July 28, 2021. Excerpt from revised E&SC plans approved by GEPA January 4, 2021, adding Pond 5 to the area which would discharge toward Marbo Cave:



The location of the Marbo Cave discharge and Pond 5, showing activity underway to install E&SC measures on July 28, 2021:

The beginning of construction work for Pond 5B. The soil embankment is to delineate a temporary storage pond, while the permanent embankment is installed just beyond (to the right). Base preparation for the permanent embankment has begun, but emplacement and compaction of embankment fill had not yet begun (July 28, 2021):

Pond 5A excavation, which according to Samsung site personnel was begun in June. However the excavation is not yet connected to the site swale, so mass runoff is unable to enter the basin. Sedimentation pictured is from incidental runoff that the excavation collected due to its location (July 28, 2021):

The perimeter swale which would discharge to Pond 5, but at the time of inspection it was not connected and sedimentation patterns showed that runoff discharged off-site (July 28, 2021)

This is the area where the perimeter swale currently discharges. A large delta-type (alluvial) formation of sediment is evident, showing that a large volume of runoff discharged off-site during the recent rainfall events (July 28, 2021).

A view of the sediment discharged off-site during the recent rainfall events. The size of the deposited rocks demonstrates that flow volumes and velocities were very high. The top of the perimeter silt fence can be seen, where it was knocked down and overtopped. (July 28, 2021)

Another view of the sediment plume/delta formation resulting from the off-site discharge during the rain events the week of July 19. This photo is looking toward the off-site properties, headed downhill roughly in the direction of Marbo Cave. (July 28, 2021)

View toward Pond 5B location. The graded area to the right of the earthen embankment is the base of the permanent pond embankment, which Samsung had not yet begun to install. (July 28, 2021)

A partial view of the uphill project area which contributed to the discharge of runoff the week of July 19. Soil and fill material has been scoured from an area several hundred feet wide, leaving bare limestone bedrock in much of the area covered by the solar panels. (July 28, 2019)